ACCELERATOR DIVISION ADMINISTRATIVE PROCEDURE

ADAP-06-0013

MAIN INJECTOR DEPARTMENT MANAGEMENT PROGRAM PLAN:

A Specific Quality Implementation Plan

RESPONSIBLE DEPARTMENT AD/MAIN INJECTOR DEPARTMENT (MID)

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TABLE OF CONTENTS

1.0 PURPOSE AND SCOPE

1.1 Purpose

The purpose of this Department Management Program Plan (MPP) is to describe the MID functions and organization and its implementation of Quality Assurance Criteria 1 through 10, as stated in the Fermilab Quality Assurance Program (dated April 1, 1992), and in conformance with the Accelerator Division (AD) MPP, ADAP-06-0001, 3/31/93), and in compliance with DOE Order 5700.6C (dated June 21, 1991).

1.2 Scope

The description and requirements of this plan are generally applicable to all activities of the MID.

2.0 MID FUNCTIONAL ANALYSIS

2.1 MID Terminal Objectives

TO.1 To coordinate and to supply dedicated, full-time personnel for the design, construction and commissioning of the Fermilab Main Injector (FMI) Project within the cost and schedule contained in the Project Management Plan (PMP). [1]

TO.2 To assure attainment of design criteria for intensity and repetition rate.[1]

TO.3 To assure compliance with all applicable environmental, health and safety requirements.[2]

2.2 Subordinate Objectives

SO. 1 To provide for the staffing of the MID and the recruitment of Level 3 Managers (L3M) such that sufficient qualified and trained personnel are on hand in a timely fashion in order that the Terminal Objectives can be accomplished.

SO. 2 To prepare a quality assurance program (namely, this document) that can be applied to all phases of the Main Injector Project, i.e., design, procurement, construction, testing, commissioning and operations.

SO. 3 To provide general overall guidance for the design of the Main Injector accelerator.

SO. 4 To establish a design-change control system that will assure that design criteria are met with cost control and schedule milestones maintained.

SO.5 To coordinate activities involving interactions between the Main Injector Department and other departments within the AD and other Laboratory Divisions/Sections, including the Directorate and Department of Energy (DOE).

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[1] See Divisional Functional Objective FO.2, on page 7 of ADAP - 06- 0001, Rev.1.

[2] See Divisional Functional Objective FO.5, on page 7 of ADAP - 06- 0001, Rev.1.

SO.6 To coordinate the construction of the Main Injector Project including supervision of the L3Ms.

SO. 7 To coordinate the tests of each FMI sub-system as it becomes available. If any deficiency is detected when the tests have been evaluated, to initiate the necessary corrective action.

SO.8 To coordinate the commissioning of the Main Injector accelerator.

SO.9 To coordinate the turn-over of the operation of the Main Injector to the AD Operations Group, and the conversion of the Main Injector Department from a construction organization to a systems department.

3.0 MID ORGANIZATION

A management organization chart for the MID is included in the FMI PMP Figure III-2, page 13. The roles, responsibilities and authorities of the four leadership positions in the MID, namely the Department Head and the three Deputy Department Heads, who also serve as the FMI Deputy Project Manager and the three Associate FMI Project Managers, respectively, are described in detail in the FMI PMP, Section III. A MID organization chart including the names of all personnel in the MID is maintained in the MID Document Control Center (DCC).

4.0 MID SPECIFIC QUALITY IMPLEMENTATION PLAN

4.1 CRITERION 1 - PROGRAM

4.1.1 This Department MPP is based on the April 1, 1992 Fermilab Quality Assurance Plan (FQAP) and on the AD MPP.

4.1.2 The FMI mission statement has been documented in the approved FMI Project Plan, a DOE document dated May 1992. The objectives of the FMI project are to design, construct, commission, and operate a 150 GeV accelerator. The commissioning goals (Table 1.1) have been established to mark the end of construction and the beginning of routine operation for the experimental programs. The operational goals (Table 1.2) are for the facility after it has been in use for some months, recognizing that progressive improvements in performance occur as regular operations for the physics research program proceed.

The AD Head/FMI Project Manager has created a MID to assist him in the execution of the project. The MID has been integrated into the AD organization in order to maximize the ease in which the new accelerator is incorporated into the existing Tevatron complex. Also this facilitates tapping support from functioning groups within the AD such as electrical, mechanical, rf, controls, instrumentation and operations.

4.1.3 The organizational structure, functional responsibilities and levels of authority for the MID have been addressed in Section 3.0 above. The job descriptions for the MID Department Head and the three Associate FMI Project Managers are found in the PMP pages 14 through 16.

Table 1.1 Technical goals of the Fermilab Main Injector

Commissioning Goals	
Proton energy for injection into the Tevatron	150 GeV
- Number of protons injected per Tevatron cycle	2×10^{13}
- Proton and antiproton transmission efficiencies	75%
Proton energy for antiproton production and test beams	120 GeV
Cycle Time to 120 GeV	2.5 sec.
- Protons to antiproton target per cycle	2×10^{12}
- Protons slow spilled per cycle	2×10^{13}

Table 1.2 Operational Goals after some months of operation*

Proton energy for injection into the Tevatron	150 GeV
- Number of protons injected per Tevatron cycle	6×10^{13}
- Proton and antiproton transmission efficiencies	95%
Proton energy for antiproton production and test beams	120 GeV
Cycle time to 120 GeV	1.5 sec.
- Protons to antiproton target per cycle	5×10^{12}
- Protons slow spilled per cycle	3×10^{13}

*Based on the FMI Project Conceptual Design Report (Revision 3.1, dated April 1992)

A complete list of tasks assigned to all MID employees is to be found in the DCC filed under "Task Assignments and Training Records."

4.1.4 The description of all organizational interfaces with other organizations at Fermilab is fully covered in the FMI Project MPP, Section 4.1.4. This material applies equally to the FMI Project and the AD/MID and is not repeated here.

4.2 CRITERION 2 - PERSONNEL TRAINING AND QUALIFICATION

4.2.1 In-house training is provided to insure that an appropriate level of skills, knowledge, expertise, and experience are available to accomplish the stated mission and subordinate objectives. Training may come from several sources such as mentoring provided by physicist, engineers, supervisors, lead personnel, consulting firms, manufacturers' operating manuals, and other sources.

Records of training received by MID members are to be found in the DCC filed under "Task Assignments and Training Records."

Those appointed to management positions within the MID are chosen for their technical and communications skills, as well as their total experience and knowledge of the working on the Laboratory. The AD does not specify any further training or education for these personnel beyond what they initially bring to their positions. However, the department head will normally request or require that personnel in management positions attend the Supervisory Development Course taught by the Laboratory Services Section. The department head may also suggest or require further technical training. The department head may suggest or require that a manager take further management training.

Supervisors within the MID are chosen by the department head. These personnel are chosen based primarily on the basis of their technical abilities. If deemed useful by the department head, an individual supervisor may be requested or required to attend the Supervisory Development course taught by the Laboratory Services Section. Other training or education, oriented toward development of technical and/or supervisory skills, may also be suggested or required by the department head, but there are no generally applicable requirements mandated by the AD.

4.2.2 Environment, Safety and Health (ES&H) training is provided to MID employees, commensurate with the hazards associated with the work performed. The AD ES&H group maintains a data file which records the detail and extent of the training received by each person and is the basis for regular periodic assessment of on-going and repeat training requirements. Specific training requirements are determined by line managers.

4.3 CRITERION 3 - QUALITY IMPROVEMENT

The description of Quality Improvement requirements and methods is fully covered in the FMI Project MPP, Section 4.3. This material applies equally to the FMI Project and the AD/MID and is not repeated here.

4.4 CRITERION 4 - DOCUMENTS AND RECORDS

The MID is responsible for implementing a documents and records management system for the FMI Project in order to insure that appropriate, auditable documents and records are retained and retrievable.

4.4.1 In compliance with DOE Order 4700.1 (June 2, 1992 Revision) the requirements for documenting the organization, functions, policies, decisions, procedures and essential transactions of the FMI Project are specified in the FMI Project Management Plan (December 1992) and documents referenced therein.

4.4.2 The Procedure ADDP-MI-0001 "FMI Document Control Center Procedures" defines when documents should fall into the Control Document category; the procedure describes the steps required for Control Documents which includes restrictions on preparation, review, approval, issuance and revisions. The current list of FMI Controlled Documents developed to date include the following:

- The FMI Title I Report
- The FMI Procedure Handbook
- Engineering Change Requests
- The Preliminary Safety Analysis Report
- The Project Management Plan

The FMI Document Control Center is housed in the AD/MID administrative office.

4.4.3 Following DOE Orders 1324.2A (Records Disposition) and 1324.5 (Records Management Program), the FMI records management activities are conducted in accordance with the "Fermilab Records Management Handbook." Detailed procedures are to be found in the Controlled Document FMI Procedures Handbook (see Procedure FMI 001 and 002).

4.4.4 A listing of existing Departmental Procedures as well as copies of the Procedures themselves are maintained by the Department Head in the FMI Document Control Center.

4.5 CRITERION 5 - WORK PROCESSES

4.5.1 The FMI Project Manager's Responsibility as described in the PMP include administering, planning, organizing, and controlling the FMI Project to meet the Project technical, cost and schedule objectives. In particular the FMI Project Manager strives for effective human resource management with the goals of hiring and maintaining an efficient and effective work force.

4.5.2 The individual MID worker is the first line in ensuring quality. The MID Department Head and the FMI Associate Project Managers are responsible for ensuring that people who are assigned to tasks have the appropriate academic qualification, professional certification, or skills and experience to carryout the work successfully.

4.5.3 The MID Department Head and the FMI Associate Project Managers are responsible for planning, authorizing, and specifying (to an appropriate level of detail) the conditions under which work is to be performed. The MID Department Head and the FMI Associate Project Managers specify which work is sufficiently complex or involves sufficient hazard to be performed to written procedures. When written procedures are deemed appropriate they will be prepared, revised, approved, and distributed as ADDP's, as prescribed by ADAP-01-0001.

4.5.4 The MID Department Head and the FMI Associate Project Managers define the performance objectives for which MID personnel will be held accountable. In addition criteria which define acceptable work performance and achievement of performance objectives with the goal of acknowledging when work has been performed acceptably and identifying areas for

improvement are also defined by the MID Department Head and the FMI Associate Project Managers.

4.5.5 The Fermilab contract with DOE defines a variety of management systems to be applied to material resources through the applicable DOE Orders and Code of Federal Regulations (CFR). As noted in the FMI Project MPP (ADAP - 06 - 0019, Rev.0, page 7), the FMI L3M (most of whom are not members of the MID) have the responsibility to insure that equipment items shall be identified and controlled to insure their proper use, and maintained to prevent their damage, loss or deterioration.

4.6 CRITERION 6 - DESIGN

4.6.1 The Fermilab Director requires that sound engineering/scientific principles and appropriate technical standards are incorporated into FMI designs to ensure that they will perform as intended. This policy is implemented by the FMI Project Manager. The FMI Title I Design Report (the FMI design handbook) has been independently reviewed in order to assure compliance with the policy.

ES&H related design input and design review requirements to ensure compliance with facility ES&H requirements are specified in the FMI PMP. These include NEPA compliance, achieved by the preparation of the FMI Environmental Assessment (EA) which lead to a Finding of No Significant Impact (FONSI) by EH-1. In addition a FMI Preliminary Safety Analysis Report (PSAR) has been completed and approved, and a Technical Safety Review has taken place.

Appropriate design controls are incorporated in the FMI Configuration Management Plan (CMP) and the FMI Control System. Changes and modifications including their validation are controlled by FMI Engineering Change Request as defined in Procedure ADDP-MI-0002. Design records are incorporated into the FMI records management system (see Procedure ADDP-MI-0001).

4.7 CRITERION 7 - PROCUREMENT

4.7.1 The Fermilab contract with DOE specifies a variety of management controls to be applied to procurements and sub-contracts through the applicable DOE Orders, Department of Energy Acquisition Regulations (DEAR) and Federal Acquisition Regulations (FAR). Details of Fermilab's implementation of procurement and sub-contract management controls are to be found in Fermilab Quality Assurance Program (April 1, 1992), page 6.

4.7.2 Implementation of procurement management requirements by the FMI Project is described in the FMI PMP, in particular see Annex I of the PMP, "Advance Acquisition or Assistance Plan for the FMI." In addition the document "FMI ES&H Procedures for Construction" requires the inclusion of applicable ES&H specifications in sub-contracts.

4.8 CRITERION 8 - INSPECTION AND ACCEPTANCE TESTING

4.8.1 The MID Department Head and the FMI Associate Project Managers define the types of work that require formal inspections and acceptance testing. When an inspection or acceptance test is performed, the characteristics and processes to be inspected or tested, the inspection techniques to be used, the hold points, and the acceptance criteria are defined as appropriate. Properly calibrated and maintained measuring and test equipment are used for acceptance testing.

4.8.2 The Accelerator Readiness Reviews for the FMI Project will conform to the requirement of DOE Order 5480.25 (Accelerator Safety Order). The subsequent operation and maintenance of the FMI will conform to the Fermilab implementation of DOE Order 5480.19 (Conduct of Operations) and DOE Order 4330.4A (Maintenance Management Program).

4.9 CRITERION 9 - MANAGEMENT ASSESSMENT

4.9.1 The FMI PMP (in particular sections IV and IX) describes how FMI Project management periodically evaluates whether or not the FMI management infrastructure and resources are properly focused on achieving the FMI mission objectives. This includes a weekly project status meeting, chaired by the MID Department Head, which is attended by the FMI Project Manager, all MID Department staff, and all L3Ms. As the FMI Project progresses, every effort will be made to apply the Risk-Based Graded Approach to Implementation as specified in ADAP - 06 - 0001, Rev.1, Section 3.0, Pages 4 and 5.

4.9.2 The ES&H performance of the FMI Project including the MID is periodically evaluated in accordance with the AD ES&H Self-Assessment Plan.

4.10 CRITERION 10 - INDEPENDENT ASSESSMENT

4.10.1 The Fermilab Director has assigned responsibility for performing independent assessment to the Quality Assurance, Conduct of Operations, and Self Assessment Offices in the directorate.

4.10.2 Independent assessments of the performance of the MID by the AD are carried out as specified in the AD MPP.

5.0 CONTROLLED DISTRIBUTION OF THIS DOCUMENT

Standard ADAP distribution.

ABBREVIATIONS AND ACRONYMS

AD ..... Accelerator Division
APM ..... Associate Project Manager
BAO ..... DOE Batavia Area Office
CFR ..... Code of Federal Regulations
CH ..... DOE Chicago Office
CMP ..... Configuration Management Plan
DEAR ..... Department of Energy Acquisition Regulations
DCC ..... Document Control Center
DOE ..... Department of Energy
EA ..... Environmental Assessment
ES&H ..... Environment, Safety & Health
FAR ..... Federal Acquisition Regulations
FMI ..... Fermilab Main Injector
FONSI ..... Finding of No Significant Impact
FQAP ..... Fermilab Quality Assurance Plan
L3M ..... Level 3 Managers
MID ..... Main Injector Department
MPP ..... Management Program Plan
NEPA ..... National Environmental Protection Agency
PCS ..... Project Control Systems
PMP ..... Project Management Plan
PSAR ..... Preliminary Safety Analysis Report
SQIP ..... Specific Quality Implementation Plan